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P0536 Effect of levofloxacin and gentamicin sulfate released from silica nanoparticles on *Escherichia coli* biofilms

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Background: Gram-negative implant-related infections show an increasing number of cases diagnosed during the last years. Trying to manage these infections, mesoporous silica nanoparticles, because to their nanostructural properties, can load a large amount of antibiotic into their pores and release them in a localized area, so the potential to treat these infections in a more efficient manner is a clear possibility. This work shows the results about biological efficacy and effect on *E. coli* biofilms of the released antibiotics levofloxacin (LVX) and gentamicin sulfate (GM) from silica mesoporous nanoparticles.

Materials/methods: Both LVX and GM were loaded onto the silica nanoparticules using the impregnation technique in ethanol or water, respectively, at room temperature. Nanoparticles: with functionalized amino groups along the outer surface of the silica nanoparticles (MSN-NH_2) and non-functionalized nanoparticles (MSN) were used. *In vitro* releasing of this drugs was performed in TSB+1% glucose medium at 37ºC, measuring antibiotic release at 0.5h, 2h, 4h, 6h, 24h, 30h, 48h, 72h and 96h. These samples were tested on planktonic *E.coli* (24 hours at 37ºC) in order to determine the biological efficacy. Also, samples were tested using the same test conditions onto *E. coli* biofilms to determine the effect the drugs on the biofilm viability.

Results: The mean value for the maximum active concentration of LVX obtained by biological efficacy is 12.57 µg/mL for MSN-NH_2 and 10.10 µg/mL for MSN, both at 0.5h. For GM, the mean value of the maximum active concentration is 5.11 µg/mL for MSN-NH_2 at 6h and 6.47 µg/mL for MSN at 24h. The biofilm viability was reduced in 99% in all tested times for LVX and both types of nanoparticles. The released GM only reduced the viability in 10% for MSN at 96h and in 99% for MSN-NH_2 after 48h, with no differences between control and the other time periods for both materials.

Conclusions: LVX released from both types of nanoparticles is able to reduce the biofilm viability, but it can't remove them completely. However, released GM only is able to reduce at 99% the viability with MSN-NH_2 after 48h.

Key words: Antibiotic, Biofilm, Nanoparticles